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## Interventions and Management

**1. J Pediatr Orthop. 2013 Jun;33(4):422-30. doi: 10.1097/BPO.0b013e3182784e16.**

**Transverse plane gait problems in children with cerebral palsy.**

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Transverse plane deviations are significant contributors to pathologic gait in children with cerebral palsy (CP). Due to limitations in neuromuscular control, balance, strength and coordination, transverse plane gait deviations are poorly tolerated in these children. Transverse plane malalignment results in lever arm dysfunction and can be seen with either intoeing or out-toeing. Frequent causes of transverse plane problems and lever arm dysfunction include long bone (femoral and/or tibial) torsion, pelvic rotation, and pes varus or valgus. Computerized motion analysis facilitates accurate identification of transverse plane abnormalities. This article addresses appropriate identification and treatment of transverse plane gait deviations in children with CP.

[PMID: 23653033](#) [PubMed - in process]

**2. NeuroRehabilitation. 2013 Jan 1;32(3):563-71. doi: 10.3233/NRE-130878.**

**Effectiveness of foot wedge and carrying weighted bag on loading the paretic lower limb in children with hemiparetic cerebral palsy.**

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Faculty of Physical Therapy, Department of Physical Therapy for Pediatrics and Pediatric Surgery, Cairo University, Giza, Egypt.

**AIMS:** To investigate the effect of foot wedge and carrying weighted bag on loading the paretic lower limb in children with hemiparetic CP. **DESIGN:** Cross-sectional study. **Participants:** A convenient sample of 18 ambulant children with spastic hemiparetic CP was evaluated. Fifteen matched normal children acted as a control group. **METHODS:** Using two calibrated scales, measurements of weight supported on each lower limb were obtained under four different standing conditions. **RESULTS:** During quiet standing, the percentage of weight supported on

the paretic limb was 35.59% with symmetry index equals 0.57. Standing with the non-paretic foot is placed on a lateral foot wedge, was the best condition that increased the percentage of weight supported on the paretic limb to 47.18% and improved the symmetry index to 0.90. Non-significant improvement of symmetry index 0.61 was recorded when carrying a weighted bag with the paretic hand, but carrying with the non-paretic hand unnecessarily loads the non-paretic limb and further decreases the symmetry index to 0.49.

**CONCLUSIONS:** Using a lateral foot wedge beneath the non-paretic foot and carrying a weighted bag with the paretic hand improve the loading function of the paretic limb and relief the non-paretic limb from overloading.

[PMID: 23648610](#) [PubMed - in process]

### 3. Phys Occup Ther Pediatr. 2013 May 8. [Epub ahead of print]

#### **How Does the Functional Mobility Scale Relate to Capacity-Based Measures of Walking Ability in Children and Youth with Cerebral Palsy?**

Wilson NC, Mackey AH, Stott NS.

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This study examined the relationship between walking performance rated on the Functional Mobility Scale (FMS) and measures of walking capacity in children with cerebral palsy (CP). A total of 143 participants with spastic CP (GMFCS levels I to III) were rated on the FMS and had assessment of self-selected walking speed (WS), fast 1 minute walk test (1MWT) and six minute walk test (6MWT). For each FMS distance, children rated 6 had significantly better 6MWT than children scored 5; children rated FMS 2, 3, or 4 had lower walking capacity measures but were not clearly distinguishable from each other. The 6MWT was an independent predictor of variation in FMS score, accounting for 20% to 27% of the variance across the three FMS distances. While walking capacity impacts on community mobility in children with CP much of the variance remains unexplained, suggesting that other factors play an important role.

[PMID: 23651175](#) [PubMed - as supplied by publisher]

### 4. J Pediatr Orthop. 2013 Jun;33(4):431-8. doi: 10.1097/BPO.0b013e31827d0afa.

#### **Subtalar fusion for pes valgus in cerebral palsy: results of a modified technique in the setting of single event multilevel surgery.**

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**BACKGROUND:** We studied the use of cortico-cancellous circular allograft combined with cannulated screw fixation for the correction of dorsolateral peritalar subluxation in a series of children with bilateral spastic cerebral palsy undergoing single event multilevel surgery. **METHODS:** Forty-six children who underwent bilateral subtalar fusion between January 1999 and December 2004 were retrospectively reviewed. Gait laboratory records, Gross Motor Function Classification System (GMFCS) levels, Functional Mobility Scale (FMS) scores, and radiographs were reviewed. The surgical technique used an Ollier type incision with a pre-cut cortico-cancellous allograft press-fit into the prepared sinus tarsi. One or two 7.3 mm fully threaded cancellous screws were used to fix the subtalar joint. Radiographic analysis included preoperative and postoperative standing lateral radiographs measuring the lateral talocalcaneal angle, lateral talo-first metatarsal angle, and navicular cuboid overlap. Fusion rate was assessed with radiographs >12 months after surgery. **RESULTS:** The mean patient age was 12.9 years (range, 7.8 to 18.4 y) with an average follow-up of 55 months. Statistically significant improvement postoperatively was found for all 3 radiographic indices: lateral talocalcaneal angle, mean improvement 20 degrees (95% CI, 17.5-22.1; P<0.001); lateral talo-first metatarsal angle, mean improvement 21 degrees (95% CI, 19.2-23.4; P<0.001); and navicular cuboid overlap, mean improvement 29% (95% CI, 25.7%-32.6%; P<0.001). FMS improved across all patients, with Gross Motor Function Classification System III children experiencing a 70% improvement across all 3

FMS distances (5, 50, and 500 m). All 3 radiographic measures improved significantly ( $P < 0.001$ ). Fusion was achieved in 45 patients and there were no wound complications. **CONCLUSIONS:** With this study, we demonstrate significant improvement in radiographic segmental alignment and overall function outcome with this modified subtalar fusion technique. We conclude that this technique is an effective complement for children with dorsolateral peritalar subluxation undergoing single event multilevel surgery.

LEVEL OF EVIDENCE: Level IV.

[PMID: 23653034](#) [PubMed - in process]

##### **5. No To Hattatsu. 2013 Mar;45(2):147-9.**

**Botulinum toxin in the treatment of cerebral palsy in childhood: the domestic expert opinions and the role of pediatric neurologists in the management for severely handicapped children [Article in Japanese]**

Nezu A, Iwasaki N.

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[PMID: 23650821](#) [PubMed - in process]

##### **6. PM R. 2013 May 3. pii: S1934-1482(13)00245-1. doi: 10.1016/j.pmrj.2013.04.022. [Epub ahead of print]**

**Adherence Associated with Oral Medications in the Treatment of Spasticity.**

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**OBJECTIVE:** Lack of adherence to medications for chronic conditions is a pervasive problem. This study examined adherence to baclofen, tizanidine, and dantrolene (FDA-approved oral spasticity medications) and identified determinants of adherence. **DESIGN:** Retrospective administrative claims data analysis, employing medical and pharmacy claims data and enrollment information from a large, national US health plan. **SUBJECTS:** and **Methods:** Subjects were commercial health plan members who: initiated treatment on baclofen, tizanidine, or dantrolene from January 1, 2004 through September 30, 2009; and had stroke, spinal cord injury (SCI), traumatic brain injury (TBI), cerebral palsy (CP), or multiple sclerosis (MS). Descriptive and logistic regression statistical analyses were performed. **MAIN OUTCOME MEASUREMENTS:** Outcomes were: adherence, measured as continuous medication possession ratio (MPR) and as a binary indicator (MPR = 0.80 = adherent; MPR < 0.80 = non-adherent); change in oral spasticity medication; and use of non-oral spasticity therapy. **RESULTS:** The study population included 2,840 subjects. Adherence overall was poor: the range of mean unadjusted MPR values was 0.10 to 0.50, indicating that at best, subjects were adherent to their index spasticity medications for 50% of their treatment periods. Unadjusted overall MPRs for baclofen and tizanidine were 20.4% and 9.1%, respectively. Less than 5% of subjects changed oral spasticity medications. Results of logistic regression to identify determinants of adherence showed that subjects treated with tizanidine versus baclofen had 37.4% lower odds of adherence and those with TBI versus stroke had 77.5% lower odds of adherence. The odds of adherence increased with age and with pre-index contracture or decubitus ulcer. **CONCLUSIONS:** Adherence to oral spasticity medication adherence was poor irrespective of index spasticity medication or condition. Results from this study indicate that physicians cannot assume that patients are adherent to prescribed oral spasticity medications. A more complete understanding of the reasons behind non-adherence is required.

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**7. Res Dev Disabil. 2013 Apr 30;34(7):2075-2084. doi: 10.1016/j.ridd.2013.03.029. [Epub ahead of print]**

**Reliability and validity of the Trunk Impairment Scale in children and adolescents with cerebral palsy.**

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Standardized clinical tools are useful for treatment planning and evaluation, however clinical tools to assess quality in trunk movements in children with cerebral palsy (CP) are sparse. We have recently reported good intra- and inter-observer reliability of the Trunk Impairment Scale (TIS) in 5-12 year old children with CP. The aim of this study was to assess reliability in adolescents (13-19 years old), and to assess the construct validity in children and adolescents in the whole age spectrum from 5 to 19 years. Video recordings of 17 children with CP with Gross Motor Function Classification (GMFCS) level I-IV were analyzed by three observers on two occasions. For construct validity the TIS was compared with Gross Motor Function Measure (GMFM), in 37 children with GMFCS levels I-IV. Intraclass correlation coefficients varied between 0.82 and 0.98, and 86% of the kappa values varied between 0.61 and 1.00, suggesting high inter- and intra-observer reliability. The smallest detectable difference (SDD) of the TIS (scale range 0-23) varied between 2.55 and 3.82 for intra- and 4.07-8.23 for inter-observer observations. The high inter-observer SDD was partly due to consistently lower TIS scores by one observer. The correlation between the TIS total score and the dimension scores of the GMFM was high (Spearman's rho: 0.80-0.87), while decreasing GMFCS levels were associated with increasing total TIS score; both findings indicating good construct validity of the TIS. This study suggests that the TIS is a reliable and valid measure of trunk control for both children and adolescents with cerebral palsy.

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**8. J Oral Maxillofac Surg. 2013 May 3. pii: S0278-2391(13)00303-0. doi: 10.1016/j.joms.2013.03.013. [Epub ahead of print]**

**Oral Myiasis-A Case Report.**

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Myiasis, a term introduced by William Hope in 1840, refers to the invasion of tissues and organs of animals and human wounds and certain body cavities by the dipteran larvae, which manifests as subcutaneous furunculoid or boil-like lesions. Oral myiasis is a rare pathology and a risk to the patient's life. A higher incidence is seen in rural areas, affecting the tropical and subtropical zones of Africa and America. It can be secondary to medical or anatomic conditions, such as cancrum oris, neglected mandibular fracture, cerebral palsy, mouth breathing, anterior open bite, incompetent lips, and use of mechanical ventilation. Myiasis also has been described after tooth extraction. All these conditions more easily allow the infestation of human tissues. Myiasis affecting the orodental complex is rare. This case report describes oral myiasis in a 25-year-old male patient who was a gardener by profession. The lesion was treated with turpentine oil, which forced the larvae out, and irrigated with normal saline solution.

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**9. Child Care Health Dev. 2013 May 9. doi: 10.1111/cch.12066. [Epub ahead of print]****Speech, communication and use of augmentative communication in young people with cerebral palsy: The SH&PE population study.**

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**BACKGROUND:** Communication is frequently impaired in young people (YP) with bilateral cerebral palsy (CP). Important factors include motoric speech problems (dysarthria) and intellectual disability. Augmentative and Alternative Communication (AAC) techniques are often employed. The aim was to describe the speech problems in bilateral CP, factors associated with speech problems, current AAC provision and use, and to explore the views of both the parent/carer and young person about communication. **METHODS:** A total population of children with bilateral CP (n = 346) from four consecutive years of births (1989-1992 inclusive) with onset of CP before 15 months were reassessed at age 16-18 years. Motor skills and speech were directly assessed and both parent/carer and the young person asked about communication and satisfaction with it. **RESULTS:** Sixty had died, eight had other conditions, 243 consented and speech was assessed in 224 of whom 141 (63%) had impaired speech. Fifty-two (23% of total YP) were mainly intelligible to unfamiliar people, 22 (10%) were mostly unintelligible to unfamiliar people, 67 (30%) were mostly or wholly unintelligible even to familiar adults. However, 89% of parent/carers said that they could communicate 1:1 with their young person. Of the 128 YP who could independently complete the questions, 107 (83.6%) were happy with their communication, nine (7%) neither happy nor unhappy and 12 (9.4%) unhappy. A total of 72 of 224 (32%) were provided with one or more types of AAC but in a significant number (75% of 52 recorded) AAC was not used at home, only in school. Factors associated with speech impairment were severity of physical impairment, as measured by Gross Motor Function Scale level and manipulation in the best hand, intellectual disability and current epilepsy. **CONCLUSIONS:** In a population representative group of YP, aged 16-18 years, with bilateral CP, 63% had impaired speech of varying severity, most had been provided with AAC but few used it at home for communication.

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**10. J Acoust Soc Am. 2013 May;133(5):3342. doi: 10.1121/1.4805651.****Acoustic vowel space and speech rate in Mandarin-speaking children with cerebral palsy.**

Hsu WC, Chen LM, Cheng FY.

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This study examines the variability in speech production in four Mandarin-speaking children: two with cerebral palsy (CP) and two typically developing (TD) from 4 to 5 years of age. Recordings collected from the picture-naming task and spontaneous interaction with adults was analyzed. Acoustic vowel space and speech rate in their production were investigated. Study findings indicated the following: (1) Due to defect in speech motor control, children with CP have a smaller overall vowel space than TD children; (2) In CP group, there are more variability of formant values of individual vowels and the vowel space of individual vowels thus overlap more; (3) There is a trend of decrease of vowel formant values in both TD and CP; (4) Children with CP tend to spend more time in speech production because of their impaired speech-motor control, in terms of syllable per minute and intelligible syllable per minute; (5) Slower speech rate seems to increase speech intelligibility in CP. However, this needs to be verified in further studies. Extended longitudinal observation can provide more complete profile of individual differences in the development of vowels and speech rate to verify these preliminary findings. The variability features in the production of children with CP provide important references in speech therapy.

[PMID: 23654990](#) [PubMed - in process]

**11. Ann Indian Acad Neurol. 2013 Jan;16(1):62-5. doi: 10.4103/0972-2327.107708.****Sleep assessment of children with cerebral palsy: Using validated sleep questionnaire.**

Elsayed RM, Hasanein BM, Sayyah HE, El-Auoty MM, Tharwat N, Belal TM.

Department of Pediatrics, Pediatric Neurology Unit, Mansoura University, Egypt.

**BACKGROUND:** On the basis of clinical experience, it seems that sleep disturbances are common in children with cerebral palsy (CP); however, there is a lack of research and objective data to support this observation. **AIM OF WORK:** Our aim was to assess sleep of children with cerebral palsy, using validated sleep questionnaire. **SUBJECTS AND METHODS:** one hundred children with diagnosis of CP were investigated via sleep questionnaires, with their ages from 2-12 years. The 100 children with CP were divided into two groups, pre-school group (52 children had a mean age  $2.35 \pm 1.04$  years) and school ages group (48 children had a mean age  $10.21 \pm 3.75$  years). **RESULTS:** We found high incidence of sleep problem in both pre-school and school age groups. We found that pre-school children have more prevalence of early insomnia (46.2%, P value 0.028) and sleep bruxism (50%, P value 0.000), while school group suffer more sleep disordered breathing (SDB) (50%, P value 0.001), more nightmares (50%, P value 0.001), more sleep talking (12.5% P value 0.049), and more excessive daytime sleepiness (EDS) (62.5%, P value 0.001). **CONCLUSION:** Results of our study indicate that CP children have high incidence of sleep problem in both pre-school and school age groups.

[PMID: 23661965](#) [PubMed] [PMCID: PMC3644784](#)

**12. Res Dev Disabil. 2013 Apr 30;34(7):2085-2091. doi: 10.1016/j.ridd.2013.03.032. [Epub ahead of print]****Assessing independency in daily activities in very preterm children at preschool age.**

Verkerk G, Jeukens-Visser M, van Wassenaer-Leemhuis A, Koldewijn K, Kok J, Nollet F.

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This study investigates whether very low birth weight (VLBW) preschoolers experience disability in daily activities and what the risk factors for disability in daily activities are. The Dutch Pediatric Evaluation of Disability Inventory (PEDI-NL) was used to detect disability in daily activities in 143 VLBW children without cerebral palsy (CP) at 44 months of corrected age (CA). Data from the psychomotor-developmental index (PDI) and the mental developmental index (MDI) of the Bayley Scales of Infant Development II (BSID II) at 24 months CA, and data relating to perinatal and socio-economic status were available. Disability in daily activities was found in 27 (19%) VLBW children without CP. High frequencies of disability were found in 19 (13%) children on the mobility domain and in 12 (8%) children on the social functioning domain. The multiple logistic regression analyses showed that low BSID II outcomes (<2 SD) were risk factors for disability in the mobility domain, but not for disability in the social functioning domain. The predictive value of the BSID II outcomes is moderate, 46% of the VLBW children with a low PDI and 44% with a low MDI developed a disability in the mobility domain. This study showed a higher frequency of disability in daily activities in VLBW preschoolers compared to term born peers. Therefore, it is suggested to assess VLBW children's performance of daily activities before they start school.

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**13. An Sist Sanit Navar. 2013 Jan-Apr;36(1):9-20.****Experiences and changes in parents of children with infant cerebral palsy: a qualitative study [Article in Spanish]**

Fernández-Alcántara M, García-Caro M, Berrocal-Castellano M, Benítez A, Robles-Vizcaíno C, Laynez-Rubio C.

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**Background.** The diagnosis of infant cerebral palsy (ICP) is a traumatic event that can provoke multiple effects and changes in the family. The aim of the study is to discover the difficulties that parents face in the process of parenting, especially in the initial period following diagnosis. **Methods.** A qualitative study was carried out through semi-structured interviews. Sixteen mothers and fathers whose children were diagnosed with cerebral palsy participated in the study. Data analysis was performed with Atlas.ti 6.2 software following a strategy of open coding. **Results.** The reception of the diagnosis is perceived as an unexpected event that makes parents change expectations and hopes related to their children. The mode of relation with the child with ICP is different from that with other children as parents are more focused on the possibility of improvement and the future evolution of their child. Changes in different aspects of the lives of these parents are shown, such as demands on time, their economic and labour situation, as well as the relationship of the couple. **Conclusions.** In providing care for children with cerebral palsy it is necessary to take the problems of the parents into account, especially in the initial period after diagnosis. The process of parenting a child with cerebral palsy entails many changes in the family so a global perspective is needed to organize interventions.

[PMID: 23648489](#) [PubMed - in process] Free full text

#### **14. Psychol Rep. 2013 Feb;112(1):266-87.**

##### **A comparison study of depression and quality of life in Turkish mothers of children with Down syndrome, cerebral palsy, and autism spectrum disorder.**

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This study aimed to compare the quality of life and depression levels in Turkish mothers of children with Down syndrome, cerebral palsy, and Autism Spectrum Disorder (ASD). An additional purpose is to identify whether the depression and quality of life levels of the mothers differ significantly based on demographic variables. Two hundred fifty-two mothers participated in the study. The World Health Organization's Quality of Life-BREF (WHOQOL-BREF-TR) assessment instrument was used to determine the mothers' quality of life and the Beck Depression Inventory (BDI) to characterize their depression. Mothers of children with cerebral palsy had significantly lower quality of life scores on the environment and national environment domains of the WHOQOL-BREF-TR than those of children with Down syndrome. No significant difference was observed in the depression of mothers. With increasing education and income, quality of life of the mothers increased whereas depression decreased. Moreover, depression increased and quality of life decreased in older mothers. Furthermore, the findings indicated significant negative correlations between mothers' depression and quality of life scores on all domains of the WHOQOL-BREF-TR.

[PMID: 23654042](#) [PubMed - in process]

#### **15. Med Pregl. 2013 Mar-Apr;66(3-4):181-4.**

##### **Mothers' resolution of their children's diagnosis of cerebral palsy [Article in Serbian]**

Krstic T, Bugarski V, Brkic N, Obradovic B.

Medicinski fakultet, Novi Sad.

**INTRODUCTION:** The process of adaptation and acceptance of a child's diagnosis of cerebral palsy requires from parents to process the trauma caused by this knowledge cognitively and emotionally. Parents who manage to come to terms with their children's condition are labeled as resolved. As opposed to them, unresolved parents do not accept the reality of their children's condition and fail to overcome the crisis caused by knowledge of the child's diagnosis. Unresolved status has negative implications for the child, the parents and their relationship. **CASE REPORTS:** Two case reports of mothers whose children have been diagnosed to have cerebral palsy are given. The first case shows a resolved mother who managed to overcome the initial shock and started to feel a sense of relief from the period when she found out the child's diagnosis. In contrast, another case shows an unresolved

mother with no significant changes in thoughts and feelings from the time since she learned the child's diagnosis. She was preoccupied with anger and attempted to minimize the child's problem. **DISCUSSION:** Interviews on reaction to diagnosis and reaction to diagnosis classification system allow identification of mothers' resolution of their children's diagnosis of cerebral palsy. The characteristics of resolved and unresolved maternal status are discussed. **CONCLUSION:** Parental resolution of diagnosis is essential for the successful adaptation to raising children with disabilities, as well as meeting the requirements of the parental role. It is important to recognize parental cognitions and feelings regarding the child's condition in order to direct psychotherapeutic interventions towards vulnerable population of parents.

[PMID: 23653998](#) [PubMed - in process]

**16. Neurologia. 2013 Apr 30. pii: S0213-4853(13)00018-2. doi: 10.1016/j.nrl.2013.01.012. [Epub ahead of print]**

**Animal assisted interventions in neurorehabilitation: A review of the most recent literature [Article in English, Spanish]**

Muñoz Lasa S, Máximo Bocanegra N, Valero Alcaide R, Atín Arratibel MA, Varela Donoso E, Ferriero G.

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**INTRODUCTION:** While conventional wisdom has always affirmed the value of animals in promoting human health and well-being, only recently has their therapeutic role in medicine become a topic for dedicated research. Animal assisted interventions (AAI) can be classified as animal-assisted activities, animal-assisted therapy, and service animal programs. **OBJECTIVE:** The aim of this review is to analyse original papers addressing AAI and neurological diseases and published in the most influential medical journals between 2001 and 2012, and discuss their findings in the light of what may be of interest in the field of neurology. **DISCUSSION:** We selected a total of 23 articles on neurorehabilitation in cerebral palsy, pervasive developmental disorders, multiple sclerosis, spinal cord injury, stroke, and mental disorders. The main therapeutic results were improvement on the Gross Motor Function Classification Scale and in upper limb dexterity (cerebral palsy); improvement in social functioning and interaction; reductions in stress, anxiety, and loneliness (pervasive developmental disorders and mental disorders); and decreased spasticity with improved balance (multiple sclerosis, spinal cord injury, stroke). **CONCLUSION:** These interventions, performed with highly specialised animals in very specific neurological populations, deliver an increasing body of scientific evidence suggesting that they are an effective complement to other existing therapies. In these diseases, further high-quality studies are warranted in order to define the most appropriate programmes for therapy.

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## Prevention and Cure

**17. PLoS One. 2013 May 2;8(5):e62683. doi: 10.1371/journal.pone.0062683. Print 2013.**

**Brain Injury in Very Preterm Children and Neurosensory and Cognitive Disabilities during Childhood: The EPIPAGE Cohort Study.**

Marret S, Marchand-Martin L, Picaud JC, Hascoët JM, Arnaud C, Rozé JC, Truffert P, Larroque B, Kaminski M, Ancel PY, For The Epipage Study Group.

Department of Neonatal Medicine, Rouen University Hospital and Region-INSERM Team, ERI 28, NeoVasc, Institute for Biomedical Research and Innovation, Rouen University, Rouen, France.

**OBJECTIVE:** To investigate the association of motor and cognitive/learning deficiencies and overall disabilities in very preterm (VPT) children and their relations to gestational age (GA) and brain lesions. **DESIGN SETTING AND**

**PARTICIPANTS:** EPIPAGE is a longitudinal population-based cohort study of children born before 33 weeks' gestation (WG) in 9 French regions in 1997-1998. Cumulating data from all follow up stages, neurodevelopmental outcomes were available for 90% of the 2480 VPT survivors at 8 years. Main outcomes were association of motor and cognitive deficiencies and existence of at least one deficiency (motor, cognitive, behavioral/psychiatric, epileptic, visual, and/or hearing deficiencies) in three GA groups (24-26, 27-28, and 29-32WG) and four groups of brain lesions (none, minor, moderate, or severe). **RESULTS:** VPT had high rates of motor (14%) and cognitive (31%) deficiencies. Only 6% had an isolated motor deficiency, 23% an isolated cognitive one and 8% both types. This rate reached 20% among extremely preterm. Psychiatric disorders and epilepsy were observed in 6% and 2% of children, respectively. The risks of at least one severe or moderate deficiency were 11 and 29%. These risks increased as GA decreased; only 36% of children born extremely preterm had no reported deficiency. Among children with major white matter injury (WMI), deficiency rates reached 71% at 24-26WG, 88% at 27-28WG, and 80% at 29-32WG; more than 40% had associated motor and cognitive deficiencies. By contrast, isolated cognitive deficiency was the most frequent problem among children without major lesions. **CONCLUSIONS:** In VPT, the lower the GA, the higher the neurodisability rate. Cerebral palsy is common. Impaired cognitive development is more frequent. Its occurrence in case without WMI or early motor disorders makes long-term follow up necessary. The strong association between motor impairments, when they exist, and later cognitive dysfunction supports the hypothesis of a common origin of these difficulties.

[PMID: 23658763](#) [PubMed - in process] [PMCID: PMC3642195](#) [Free PMC Article](#)

**18. Res Dev Disabil. 2013 Apr 30;34(7):2234-2250. doi: 10.1016/j.ridd.2013.03.031. [Epub ahead of print]**

**Relationship between brain structure on magnetic resonance imaging and motor outcomes in children with cerebral palsy: A systematic review.**

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Magnetic resonance imaging (MRI) is recommended in all children with cerebral palsy (CP) where the aetiology has not been established, and the major presenting problem in CP is reduced motor capacity. A systematic review of the literature was performed to investigate the relationship between brain structure on MRI and motor outcomes in children with CP. A total of 37 studies met inclusion criteria, and were analysed in terms of (a) population characteristics, (b) MRI data, (c) motor outcome data, and (d) the relationship between MRI data and motor outcomes. All studies used a qualitative system to classify brain lesions; however, few reported information about the location and extent of lesions. Valid and reliable classifications of motor abilities were not always used, and three studies did not link motor findings to MRI features. There was, however, a relationship between the type of brain lesion on MRI and two specific motor outcomes, namely gross motor functional classification (using GMFCS) and motor type. This relationship could aid in the prediction and optimisation of early interventions for children with CP. There is also need for a quantitative MRI classification measure which includes detailed information about the location and severity of lesions.

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**19. Biomed J. 2013 Mar-Apr;36(2):84-9. doi: 10.4103/2319-4170.110399.**

**Retinopathy of Prematurity in Neonatal Patients with Birth Weight Greater than 1500 g in Taiwan.**

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**Background:** To understand the characteristics, ophthalmic outcomes, and risk factors of retinopathy of prematurity (ROP) in patients with birth weight (BW) greater than 1500 g. The applicability of the ROP screening criteria to the Taiwanese population was also examined. **Methods:** The study included 104 eyes from 54 ROP patients who had

BW greater than 1500 g from 1981 to 2008. Demographic information, disease courses, ophthalmic outcomes, and possible systemic risk factors were recorded. The infants were divided into groups of mild and severe ROP for a risk factor analysis. Results: The mean gestational age (GA) of the infants was  $31 \pm 1.3$  weeks, and the mean BW was  $1675 \pm 249$  g. Mild ROP regressed in 94 eyes (90%), and 10 eyes (10%) developed severe ROP. After various treatments, the regression rates for prethreshold or threshold ROP ( $n = 8$ ) and stage 4 ROP ( $n = 2$ ) were 100% and 50%, respectively. Forty-eight patients (85%) had at least three associated systemic risk factors. A multiple logistic regression analysis revealed that patients with an intraventricular hemorrhage were found to have an increased chance of developing severe ROP, especially those with BW greater than 1500 g ( $p = 0.015$ ). There was also a significant association between patients who had severe ROP and an increased risk of having cerebral palsy (CP) at 1.5 years of age ( $p = 0.013$ ). Conclusion: The majority of patients with BW greater than 1500 g developed mild ROP. However, advanced ROP with poor visual outcome was also encountered in some patients.

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**20. Dev Med Child Neurol. 2013 May 6. doi: 10.1111/dmcn.12160. [Epub ahead of print]**

**Neonatal neuroimaging predicts recruitment of contralesional corticospinal tracts following perinatal brain injury.**

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AIM: Unilateral perinatal brain injury may result in recruitment of ipsilateral projections originating in the unaffected hemisphere and development of unilateral spastic cerebral palsy (USCP). The aim of this study was to assess the predictive value of neonatal neuroimaging following perinatal brain injury for recruitment of ipsilateral corticospinal tracts. METHOD: Neonatal magnetic resonance imaging (MRI) and cranial ultrasound scans of 37 children (20 males, 17 females; median [range] gestational age 36 wks+4 [26+6 -42wks+5 ] and birthweight 2312 g ([770-5230g]) with unilateral perinatal arterial ischaemic stroke ( $n=23$ ) or periventricular haemorrhagic infarction ( $n=14$ ) were reviewed and scored for involvement of the corticospinal trajectory. Hand function was assessed using the Assisting Hand Assessment (AHA) and transcranial magnetic stimulation (TMS) was performed (age range 7y 4mo-18y and 7mo) to determine the type of cortical motor organization (normal, mixed or ipsilateral). Neuroimaging scores were used to predict TMS patterns. RESULTS: Eighteen children developed USCP with ipsilateral corticospinal tract projections in 13 children (eight mixed, five ipsilateral). AHA scores decreased with increased ipsilateral projections. Asymmetry of the corticospinal tracts seen on neonatal MRI was predictive of development of USCP and recruitment of ipsilateral tracts (positive and negative predictive value of 73% and 91%). INTERPRETATION: Neonatal neuroimaging can predict recruitment of ipsilateral corticospinal tracts. Early knowledge of the expected pattern of cortical motor organization will allow early identification of children eligible for early therapy.

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**21. Exp Neurol. 2013 May 4. pii: S0014-4886(13)00145-3. doi: 10.1016/j.expneurol.2013.04.015. [Epub ahead of print]**

**A novel reproducible model of neonatal stroke in mice: Comparison with a hypoxia-ischemia model.**

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Neonatal stroke occurs in 1/4000 live births and leaves life-long neurological impairments, such as cerebral palsy and epilepsy. Currently, the rodent models of neonatal stroke that are available exhibit significant inter-animal variability, which makes it difficult to accurately assess the mechanisms of brain injury and the efficacy of candidate

treatments. We aimed to introduce a novel, highly reproducible model of stroke, middle cerebral artery occlusion (MCAO), in immature mice, and to evaluate the reproducibility of this model compared with a conventional hypoxia-ischemia (HI) model. Postnatal day 12 CB-17 mice underwent left MCAO by direct electrocoagulation. The MCAO model exhibited excellent long-term survival; 85% up to 8 weeks after the insult. Infarct was evident in every animal with MCAO (n=27) and was confined to the cortex, with the exception of some mild thalamic injury. While the % stroke volume 48h after the insult was consistent in the MCAO group, range: 17.8-30.4% (minimum-maximum), it was substantially less consistent in the HI group, range: 3.0-70.1%. This contrasting variability between the two models was also evident in the cerebral blood flow, 24h after the insult, and in the ipsilateral hemispheric volume, as assessed at 8 weeks after the insult. Mice with MCAO exhibited significant neurofunctional deficits in the rotarod and open-field tests. Preclinical studies for neonatal stroke could become more reliable using this model, with even a potential reduction in the number of pups required for statistical significance. The contrasting variability between the two models may provide insights into the factors that contribute to inter-animal variability in brain injury.

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## 22. Neurosciences (Riyadh). 2003 Jan;8(1):26-9.

### Cerebral palsy in Saudi children.

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**OBJECTIVE:** To describe the clinical profile, and identify its risk factors, of cerebral palsy (CP) as seen in a cohort of consecutive Saudi children aged between one and 3 years of age prospectively over a one-year period. **METHODS:** Saudi children aged 1-3 years with CP (diagnosis based on specified criteria) were selected from children presenting to the Neurology service at the King Fahd Hospital of the University, Al-Khobar, Kingdom of Saudi Arabia with delayed milestones, seizures, mental retardation and difficulty with walking and evaluated at 3-monthly intervals for one year from January to December 2000. Information on gestation duration, labor and delivery, birth weight and the medical history of the mothers was obtained. Cranial computerized tomography and electroencephalography were carried out in addition to baseline investigations (toxoplasmosis, other, rubella, cytomegalovirus, and herpes simplex virus serology, serum lactate, pyruvate, amino acid screen, thyroid function tests, and chromosome analysis). Somatosensory, molecular genetics and muscle biopsy for histopathologic and histochemical studies were not performed in any of the patients. **RESULTS:** One hundred and eighty-seven children with CP were seen during the study period: 109 males (mean age 20.3 +/- 8.69 months); 78 females (mean age 20.6 +/- 8.55 months). Seventy-three had microcephaly (<5th percentile) with a mean head circumference of 44.5 +/- 3.69 cms for males and 43.0 +/- 4.16 for females. The main symptoms were inability to walk independently (54%), delayed speech (52%) and seizures (45%). The main neurologic features were motor weakness (85%), spasticity (60%), language dysfunction (42%), mental retardation (31%) and head lag (30%). A history of previous CP in the family was obtained in 8 patients (4%) but none of them had other features of hereditary spastic paraplegia. Electroencephalography abnormalities, present in 113 (73%) were more frequent in those without seizures than with seizures. Cranial computerized tomography abnormalities were mainly cerebral atrophy (60%) and hydrocephalus (53.7%). Twenty-five percent were from twin pregnancies; 56 (34%) were of low birth weight, 20% were pre-term deliveries, birth asphyxia was present in 165 and breech presentation was encountered in 8%. **CONCLUSION:** The main risk factors identified were twin pregnancy, pre-term delivery, prolonged labor, low birth weight and a history of previous CP in the family. Our findings suggest that improved maternal and childcare particularly in the ante and perinatal periods may reduce the incidence of CP in this environment.

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**23. Seizure. 2013 May 2. pii: S1059-1311(13)00113-1. doi: 10.1016/j.seizure.2013.04.014. [Epub ahead of print]**

**Clinical spectrum and treatment outcome of West Syndrome in children from Northern India.**

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**PURPOSE:** This study was intended to document the clinical profile and treatment outcome of West syndrome in children attending a tertiary care center in Northern India. **METHOD:** Data were collected by a retrospective chart review of children diagnosed with West syndrome between January 2008 and January 2012. Information was recorded pertaining to the age at onset and presentation, etiology, and associated co-morbidities; results of electroencephalography (EEG) and neuroimaging; treatment given; and final outcome. The following drugs were used for treatment: pyridoxine, prednisolone, vigabatrin, sodium valproate, nitrazepam, topiramate, and levetiracetam. The response was categorized as spasm cessation, partial improvement (>50% improvement), or no improvement. The final outcome was considered favorable when there was a complete cessation of spasms; with absence of relapse and no progression to other seizure types for at least 6 months. **RESULTS:** Records of 148 children (120 boys) were analyzed. The mean (SD) age at onset and presentation was 5.3 (4.6) months, and 13.1 (7.3) months, respectively. Perinatal asphyxia (61.4%), neonatal sepsis/meningitis (10.6%), and postnatal meningitis (11.4%) were the predominant causes. The etiology could not be ascertained in 16.6% of children. Favorable outcome was observed in 45 (30.4%) children with spasm cessation rate of 25.4% with prednisolone. Age at onset, gender, time lag to treatment, presence of perinatal asphyxia, or co-morbid cerebral palsy did not affect the final outcome. **CONCLUSION:** This study highlights the developing country perspective of children with West syndrome, including delayed presentation, adverse perinatal events as the predominant etiology, and modest response to oral steroids.

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**24. World J Pediatr. 2012 Nov;8(4):293-300. doi: 10.1007/s12519-012-0372-2. Epub 2012 Nov 15.**

**An overview of risk factors for poor neurodevelopmental outcome associated with prematurity.**

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**BACKGROUND:** Preterm birth is a major cause of neonatal mortality and morbidity. While advances in medical care have improved the survival of preterm infants, neurodevelopmental problems persist in this population. This article aims to review factors associated with their neurodevelopmental outcomes. **DATA SOURCES:** English language studies of neurodevelopmental outcomes in preterm infants were retrieved from PubMed. A total of 100 related publications were included. **RESULTS:** Early gestational age and birth weight are the most significant predictors of poor long-term neurological outcome. Structural changes of the brain, infection, male gender and neonatal intensive care unit course are also important factors affecting eventual outcome. Other complex biological and socio-economic factors, which extend from prenatal through postnatal periods, up through and including adulthood, also affect the trajectory of brain development in preterm infants. **CONCLUSIONS:** Neurodevelopmental problems continue to affect the preterm population. There is a critical need for collaboration among geneticists, obstetricians, pediatricians, and neuroimaging and rehabilitation experts to determine early predictive factors and neuroprotective therapies to properly treat or prevent poor neurodevelopmental outcomes in these infants.

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